

For more than a century, the problem of how a single electron behaves in water and other solvents has been central to many science areas; e.g., radiation chemistry and biology. Only recently has it become possible to capture the electron dynamics in water cavities of well-defined sizes and to decipher the elementary steps involved in the wetting and hydration of the electron by the surrounding water molecules. This new advance was achieved using ultrashort lasers of femtosecond (a millionth of a billionth of a second) duration and mass selection of individual water clusters having 5, 10, and up to 50 water molecules. Remarkably, the wetting process is ultrashort in duration and hydration is complete in ~ 300 femtoseconds, mimicking bulk water behavior. The results suggest a microscopic description involving the first water shell of molecules even in bulk hydration.

Ultrafast Snapshots of Electrons in Water

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